INFORMATION SHEET

ORDER NO. R5-2005-____
STATE OF CALIFORNIA DEPARTMENT OF FISH AND GAME
NIMBUS SALMON AND STEELHEAD HATCHERY
AMERICAN RIVER TROUT HATCHERY
SACRAMENTO COUNTY

FACILITY DESCRIPTION

The California Department of Fish and Game (DFG) (hereafter Discharger) operates the Nimbus Salmon and Steelhead Hatchery (NFH) and the American River Trout Hatchery (ARTH) on land owned by the United States Bureau of Reclamation at 2001 Nimbus Road in Rancho Cordova, Sacramento County, California. The facilities are co-located and regulated under a single NPDES permit and are hereafter referred to as the Facility. The NFH produces juvenile Chinook salmon and steelhead trout to mitigate for the loss of anadromous fisheries resources due to the operation of Folsom and Nimbus dams. The NFH traps adult fish, collects, incubates, and hatches fish eggs, and rears juvenile fish. The fish are reared for up to a year, based on management strategy, and trucked to release sites. The fish rearing occurs in concrete raceways utilizing a flow-through, single-pass water system. The NFH consists of a fish ladder for adult salmon and steelhead, four holding ponds for adult fish, a spawning deck for egg removal and fertilization, two hatchery buildings (No. 1 and 2), six 10-ft by 400-ft raceways for rearing, and ancillary operations. The NFH's current goal for fish rearing is approximately 430,000 steelhead and 4 million salmon per year. Fish are transferred from the NFH to California water bodies for release. The ARTH obtains fish eggs or fingerling fish from other hatcheries, or collects fish eggs at remote sites. The eggs are incubated and hatched, and fish are reared to various sizes to accommodate management strategies. Most of the fish are reared for almost a year to reach "catchable size" (1/2 pound). The ARTH receives fertilized trout eggs for hatching and raises fish in one hatchery building, four 10-ft by 200-ft nursery ponds, and ten 10-ft by 600-ft raceways. A small number of inland salmon are also raised at the ARTH. A fish disease control laboratory is located at the ARTH. The ARTH's current goal for fish rearing is approximately one million fish per year. Fish are transferred from the ARTH to several California water bodies for release.

In its Report of Waste Discharge, dated 17 July 2002, the Discharger reported the following total yearly harvestable weights: 600,000 lbs of trout, 70,000 lbs of salmon, and 130,000 lbs of steelhead. The Discharger also reported 90,000 lbs of food fed during the month of maximum feeding (May). The Facility meets the criteria for a concentrated aquatic animal production (CAAP) facility, as established by USEPA at 40 Code of Federal Regulations (CFR) 122.24, as discussed below.

The NFH and the ARTH receive water from Lake Natoma, upstream from Nimbus Dam, via a common 60-inch line. Lake Natoma is part of the American River system which flows from the Sierra Nevada mountain range to Folsom Lake, through Lake Natoma, to the Sacramento River. Combined water intake for both hatcheries was reported by the Discharger as approximately 39 to 45 million gallons per day (mgd), and, as stated in the previous Order, can be as high as 90 mgd. Intake flow is controlled by the Discharger and is adjusted to meet operational needs (e.g., intake flow is reduced when the raceways are cleaned). The hatcheries also receive minor flow from Lake Natoma via an older 42-inch line (estimated to be less than 4.2 mgd). Flow through the 42-inch line

is maintained to prevent water in the line from becoming stagnant. All water is used on a once-through basis, and is discharged to the American River through four outfalls (001, 002, 003, and 004).

The Facility includes two parallel settling ponds for the disposal of wastewater from raceways and rearing ponds during normal cleaning operations, and from the incubator building, the fish disease lab, and local surface drainage. The settling ponds were constructed in highly permeable gravels, which allow the entire flow to indirectly discharge to the American River through seepage. The settling ponds were also constructed with overflow facilities to a 12-inch pipe that discharges directly to the American River (Outfall 004). Total flow to these ponds varies from approximately 20 to 40 mgd. Because of rapid infiltration within the ponds, the Discharge reports that the ponds have not overflowed and discharged via Outfall 004 directly to the American River for at least the last six years.

Wastes generated at the Facility include fish fecal material, unconsumed fish food, nutrients, algae, silt, chemicals, and therapeutic agents used to treat fish and control disease. According to monthly self-monitoring and laboratory reports submitted by the Facility between March 2000 and September 2003, influent water quality had the following characteristics.

Constituent	Units	Min	Max	Avg *
Total Suspended Solids (TSS)	mg/L	< 1.0	6.2	1.9
Settleable Solids	ml/L	0**	0**	0**
pH	standard units	6.6	8.0	--
Total Dissolved Solids (TDS)	mg/L	24	117	45
Turbidity	NTUs	0.51	3.5	1.2
Dissolved Oxygen	mg/L	5.3	12.2	9.3
Conductivity	µmhos/cm	39	218	62

* Average of quantifiable values only
** Settleable solids reported as "0" rather than < Reportable Level

Overflow from the NFH holding ponds and fresh water, if needed, comprise the water discharged from the NFH fish ladder to the American River through Outfall 001. Discharge from Outfall 001 is seasonal, with flow typically from November to April when the fish ladder is open. The Discharger has estimated the flow from Outfall 001 to be 19 mgd. Based on data from monthly self-monitoring and laboratory reports submitted by the Facility between March 2000 and September 2003, the following effluent characteristics describe the discharge from Outfall 001:

Constituent	Units	Min	Max	Avg *
TSS	mg/L	< 1.0	7.1	2.9
Settleable Solids	ml/L	0**	0**	0**
pH	standard units	6.9	7.9	--
TDS	mg/L	23	82	43.9

Constituent	Units	Min	Max	Avg *
Turbidity	NTUs	0.66	5.5	2.1
Dissolved Oxygen	mg/L	7.8	11.6	10.6
Conductivity	µmhos/cm	48	88	65.0

* Average of quantifiable values only
** Settleable solids reported as "0" rather than < Reportable Level

Wastewaters from the NFH hatchery buildings (water used for egg incubation and hatching) and the NFH spawning deck (water used during egg removal) are discharged to the American River through Outfall 002. The Discharger has estimated Outfall 002 flow to be 3 mgd. Based on data from monthly self-monitoring and laboratory reports submitted by the Facility between March 2000 and September 2003, the following effluent characteristics describe the discharge from Outfall 002:

Constituent	Units	Min	Max	Avg *
TSS	mg/L	< 1.0	10	2.6
Settleable Solids	ml/L	0**	0**	0**
pH	standard units	6.9	8	--
TDS	mg/L	20	98	43.1
Turbidity	NTUs	0.52	4.8	1.6
Dissolved Oxygen	mg/L	7.3	12.1	9.9
Conductivity	µmhos/cm	44	88	63.3

* Average of quantifiable values only
** Settleable solids reported as "0" rather than < Reportable Level

Outfall 003 consists solely of wastewater from the ARTH rearing ponds (raceways). Approximately 50% of the ARTH rearing ponds flow during normal operations is directly discharged to the American River through Outfall 003. All flow from the ARTH raceways is diverted to the settling ponds when the raceways are being cleaned, or when treatment chemicals are added. The estimated flow from Outfall 003 is 18 mgd. Based on data from monthly self-monitoring and laboratory reports submitted by the Facility between March 2000 and September 2003, the following effluent characteristics describe the discharge from Outfall 003:

Constituent	Units	Min	Max	Avg *
TSS	mg/L	< 1.0	7.4	3.4
Settleable Solids	ml/L	0**	0**	0**
pH	standard units	6.6	7.8	--
TDS	mg/L	16	100	45.0
Turbidity	NTUs	0.67	7.2	1.5
Dissolved Oxygen	mg/L	5.8	9.8	7.8
Conductivity	µmhos/cm	39	90	62.0

* Average of quantifiable values only
** Settleable solids reported as "0" rather than < Reportable Level

Outfall 004 discharges to the American River any overflow from the two settling ponds at the Facility. The settling ponds receive wastewaters from the following sources: 50% of the flow from the ARTH rearing ponds (the other 50% of flow from the ARTH rearing ponds is discharged through Outfall 003, as described previously), all the wastewater flows from the NFH hatchery raceways, the ARTH hatchery building, the ARTH nursery ponds, and the ARTH fish disease laboratory. Because the ponds are permeable and discharge to the American River via seepage, the Discharger reports it has not discharged from Outfall 004 for at least six years.

Outfall 005: As described previously, the Discharger reports it has not discharged from Outfall 004 (overflow from the settling ponds) for at least six years. To ensure adequate characterization of wastewater from the Facility during drug and chemical treatment and the potential effects of percolation from the settling ponds to surface waters, this Order requires monitoring of wastewater discharged to the settling ponds (new Outfall 005) and monitoring of the American River downstream of the settling ponds, as required by the previous Order. No numeric discharge specifications are applied to Outfall 005

Water used for cleaning lab glassware is discharged to a closed system at the Fish and Wildlife Pollution Control Laboratory, which is under separate requirements of another Waste Discharge Requirements Order. Such wastewater is disinfected and sent to a lined evaporation waste pond that has no discharge to surface or ground waters. All domestic wastewater is discharged to an on-site septic system, which is regulated by the County of Sacramento.

Aquaculture drugs and chemicals are used at the Facility to treat fish directly for parasites, fungi, and bacteria, as well as to clean rearing raceways in order to reduce the spread of disease among the confined fish population. Since May 2000, the Discharger has reported the use of the following drugs and chemicals at the Facility: copper sulfate, formalin (as a 37% formaldehyde, methanol-free solution), sodium chloride (salt), hydrogen peroxide, potassium permanganate, oxytetracycline (Terramycin®) as a feed additive, and penicillin G.

The Discharger indicated in its Report of Waste Discharge and confirmed in a subsequent communication with the Regional Board, dated 23 April 2004, the potential use of the following additional aquaculture drugs and chemicals in the future: acetic acid, calcium chloride, P.V.P. iodine/iodophor, chloramine-T, tricaine methanesulfonate (MS-222), Aqui-S®, soluble oxytetracycline, Romet-30® (sulfadimethoxine-ormetoprim), florfenicol, carbon dioxide, sodium bicarbonate, amoxycillin, erythromycin, vibrio vaccine, and enteric redmouth bacertin.

APPLICABLE REGULATIONS, POLICIES, AND PLANS

A cold-water concentrated aquatic animal production (CAAP) facility is defined in Title 40 of the Code of Federal Regulations (40 CFR 122.24) as a fish hatchery, fish farm, or other facility which

contains, grows, or holds cold-water fish species or other cold water aquatic animals including, but not limited to, the Salmonidae family of fish (e.g. trout and salmon) in ponds, raceways, or other similar structures. In addition, the facility must discharge at least 30 calendar days per year, produce at least 20,000 pounds harvest weight (9,090 kilograms) of aquatic animals per year, and feed at least 5,000 pounds (2,272 kilograms) of food during the calendar month of maximum feeding. A facility that does not meet the above criteria may also be designated a cold water CAAP facility upon a determination that the facility is a significant contributor of pollution to waters of the United States [40 CFR 122.24(c)]. Cold water, flow-through CAAP facilities are designed to allow the continuous flow of fresh water through tanks and raceways used to produce aquatic animals (typically cold-water fish species). Flows from CAAP facilities ultimately are discharged to waters of the United States and of the State. 40 CFR 122.24 specifies that CAAP facilities are point sources subject to the National Pollutant Discharge Elimination System (NPDES) program. The Discharger's facility meets the definition of a cold-water, flow-through CAAP.

The operation of CAAP facilities may introduce a variety of pollutants into receiving waters. The U.S. Environmental Protection Agency (USEPA) identifies three classes of pollutants: (1) conventional pollutants (i.e., total suspended solids (TSS), oil and grease (O&G), biochemical oxygen demand (BOD), fecal coliforms, and pH); (2) toxic pollutants (e.g., metals such as copper, lead, nickel, and zinc and other toxic pollutants; and (3) non-conventional pollutants (e.g., ammonia-N, Formalin, and phosphorus). The most significant pollutants discharged from CAAP facilities are solids from uneaten feed, as well as fish feces that settles to the bottom of the raceways. Both of these types of solids are primarily composed of organic matter including BOD, organic nitrogen, and organic phosphorus.

Fish raised in CAAP facilities may become vulnerable to disease and parasite infestations. Various aquaculture drugs and chemicals are used periodically at CAAP facilities to ensure the health and productivity of the confined fish population, as well as to maintain production efficiency. Aquaculture drugs and chemicals are used to clean raceways and to treat fish for parasites, fungal growths and bacterial infections. Aquaculture drugs and chemicals are also used to anesthetize fish prior to spawning or prior to the annual "tagging" process. As a result of these operations and practices, drugs and chemicals may be present in discharges to waters of the United States or waters of the State.

USEPA has promulgated Effluent Limitation Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category (hereafter "ELG"). The ELG regulation establishes national technology-based effluent discharge requirements for flow-through and recirculating systems and for net pens based on Best Practicable Control Technology Currently Available (BPT); Best Control Technology for Conventional Pollutants (BCT); Best Available Technology Economically Achievable (BAT); and New Source Performance Standards (NSPS). In its proposed rule, published on 12 September 2002, USEPA proposed to establish numeric limitations for a single constituent – total suspended solids (TSS) – while controlling the discharge of other constituents through narrative requirements. In the final rule, however, USEPA determined that, for a nationally applicable regulation, it would be more appropriate to promulgate

qualitative TSS limitations in the form of solids control best management practices (BMP) requirements. Furthermore, the final ELG does not include numeric effluent limitations for non-conventional and toxic constituents, such as aquaculture drugs and chemicals, but also relies on narrative limitations to address these constituents.

The Regional Board adopted a *Water Quality Control Plan*, *Fourth Edition, for the Sacramento and San Joaquin River Basins* (hereafter Basin Plan). The Basin Plan designates beneficial uses, establishes water quality objectives, and describes an implementation program and policies to achieve water quality objectives for all waters of the Basin. This includes plans and policies adopted by the State Water Resources Control Board (SWRCB) and incorporated by reference, such as Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California" (Resolution No. 68-16). These requirements implement the Basin Plan. The Basin Plan, as amended, designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for waters of the Basin. Pursuant to the California Water Code Section 13263(a), waste discharge requirements must implement the Basin Plan.

USEPA adopted the *National Toxics Rule* (NTR) on 22 December 1992, which was amended on 4 May 1995 and 9 November 1999, and the *California Toxics Rule* (CTR) on 18 May 2000, which was amended on 13 February 2001. These Rules contain water quality standards applicable to this discharge. The SWRCB adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Policy or SIP) on 2 March 2000, which contains policies and procedures for implementation of the NTR and the CTR.

Resolution No. 68-16 requires the Regional Board, in regulating discharges of waste, to maintain high quality waters of the State until it is demonstrated that any change in water quality will be consistent with the maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Regional Board's policies (e.g., water quality constituents in concentrations that exceed water quality objectives). Resolution 68-16 requires that discharges be regulated to meet best practicable treatment or control in order to assure that pollution or nuisance will not occur; and the highest water quality be consistently maintained for the maximum benefit to the people of the State. The Board has considered Resolution 68-16 and Federal antidegradation regulations at 40 CFR 131.12.

Section 303 (d) of the CWA requires states to identify waters for which implementation of technology-based effluent limitations have not been stringent enough to attain water quality standards for those waters. On 25 July 2003 the USEPA approved the State's updated list of 303 (d) impaired waters, which lists the Lower American River between Nimbus Dam and the Sacramento River as impaired for mercury, with the potential sources identified as abandoned mines, and unknown toxicity.

Regulation of Aquaculture Drugs and Chemicals

CAAP facilities produce fish and other aquatic animals in greater numbers than natural stream conditions would allow; therefore, system management is important to ensure that fish do not become overly stressed, making them more susceptible to disease outbreaks. The periodic use of various aquaculture drugs and chemicals is needed to ensure the health and productivity of cultured aquatic stocks and to maintain production efficiency.

CAAP facilities may legally obtain and use aquaculture drugs in one of several ways. Some aquaculture drugs and chemicals used at CAAP facilities in the Region are approved by the U.S. Food and Drug Administration (FDA) for certain aquaculture uses on certain aquatic species. Others have an exemption from this approval process when used under certain specified conditions. Still others are not approved for use in aquaculture, but are considered to be of "low regulatory priority" by FDA (hereafter "LRP drug"). FDA is unlikely to take regulatory action related to the use of a LRP drug if an appropriate grade of the chemical or drug is used, good management practices are followed, and local environmental requirements are met (including NPDES permit requirements). Finally, some drugs and chemicals may be used for purposes, or in a manner not listed on their label (i.e., "extra-label" use) under the direction of licensed veterinarians for the treatment of specific fish diseases diagnosed by fish pathologists. It is assumed that veterinarian-prescribed aquaculture drugs are used only for *short periods of duration* during acute disease outbreaks. Each of these methods of obtaining and using aquaculture drugs is discussed in further detail below.

It is the responsibility of those using, prescribing, or recommending the use of these products to know which aquaculture drugs and chemicals may be used in CAAP facilities in the Region under all applicable federal, State, and local regulations and which aquaculture drugs and chemicals may be discharged to waters of the United States and waters of the State in accordance with this permit. A summary of regulatory authorities related to aquaculture drugs and chemicals is outlined below.

Summary of Regulatory Authorities

FDA is responsible for ensuring the safety, wholesomeness, and proper labeling of food products; ensuring the safety and effectiveness of both human and animal drugs; and ensuring compliance with existing laws governing these drugs. The Federal Food, Drug, and Cosmetic Act (FFDCA), the basic food and drug law of the United States, includes provisions for regulating the manufacture, distribution, and the use of, among other things, new animal drugs and animal feed. FDA's enforcement activities include correction and prevention of violations, removing illegal products or goods from the market, and punishing offenders. Part of this enforcement includes testing domestic and imported aquacultural products for drug and pesticide residues.

FDA's Center for Veterinary Medicine (CVM) regulates the manufacture, distribution, and use of animal drugs. CVM is responsible for ensuring that drugs used in food-producing animals are safe and effective and that food products derived from treated animals are free from potentially harmful

residues. CVM approves the use of new animal drugs based on data provided by a sponsor (usually a drug company). To be approved by CVM, an animal drug must be effective for the claim on the label) and safe when used as directed for (1) treated animals; (2) persons administering the treatment; (3) the environment, including non-target organisms; and (4) consumers. CVM establishes tolerances and animal withdrawal periods as needed for all drugs approved for use in food-producing animals. CVM has the authority to grant investigational new animal drug (INAD) exemptions so that data can be generated to support the approval of a new animal drug.

There are several options for CAAP facilities to legally obtain and use aquaculture drugs. Aquaculture drugs and chemicals can be divided into four categories as outlined below: approved drugs, investigational drugs, unapproved drugs of low regulatory priority, and extra-label use drugs.

- ***FDA approved new animal drugs***

Approved new animal drugs have been screened by the FDA to determine whether they cause significant adverse public health or environmental impacts when used in accordance with label instructions. Currently, there are six new animal drugs approved by FDA for use in food-producing aquatic species. These six FDA-approved new animal drugs are:

1. Chorionic gonadrotropin (Chlorulun®), used for spawning;
2. Oxytetracycline (Terramycin®), an antibiotic;
3. Sulfadimethoxine-ormetoprim (Romet-30®), an antibiotic;
4. Tricaine methanesulfonate (MS-222, Finquel® and Tricaine-S), an anesthetic;
5. Formalin (Formalin-F®, Paracide F® and PARASITE-S®), used as a fungus and parasite treatment; and
6. Sulfamerazine, an antibiotic.

Each aquaculture drug in this category is approved by FDA for use on specific fish species, for specific disease conditions, for specific dosages, and with specific withdrawal times. Product withdrawal times must be observed to ensure that any product used on aquatic animals at a CAAP facility does not exceed legal tolerance levels in the animal tissue. Observance of the proper withdrawal time helps ensure that products reaching consumers are safe and wholesome.

FDA-approved new animal drugs that are added to aquaculture feed must be specifically approved for use in aquaculture feed. Drugs approved by FDA for use in feed must be found safe and effective. Approved new animal drugs may be mixed in feed for uses and at levels that are specified in FDA medicated-feed regulations only. It is unlawful to add drugs to feed unless the drugs are approved for feed use. For example, producers may not top-dress feed with a water-soluble, over-the-counter antibiotic product. Some medicated feeds, such as Romet-30®, may be manufactured only after the FDA has approved a medicated-feed application (FDA Form 1900) submitted by the feed manufacturer.

- ***FDA Investigational New Animal Drugs (INAD)***

Aquaculture drugs in this category can only be used under an investigational new animal drug or "INAD" exemption. INAD exemptions are granted by FDA CVM to permit the purchase, shipment and use of an unapproved new animal drug for investigational purposes. INAD exemptions are granted by FDA CVM with the expectation that meaningful data will be generated to support the approval of a new animal drug by FDA in the future. Numerous FDA requirements must be met for the establishment and maintenance of aquaculture INADs.

There are two types of INADs: standard and compassionate. Aquaculture INADs, most of which are compassionate, consist of two types: routine and emergency. A compassionate INAD exemption is used in cases in which the aquatic animal's health is of primary concern. In certain situations, producers can use unapproved drugs for clinical investigations (under a compassionate INAD exemption) subject to FDA approval. In these cases, CAAP facilities are used to conduct closely monitored clinical field trials. FDA reviews test protocols, authorizes specific conditions of use, and closely monitors any drug use under an INAD exemption. An application to renew an INAD exemption is required each year. Data recording and reporting are required under the INAD exemption in order to support the approval of a new animal drug or an extension of approval for new uses of the drug.

- ***FDA Unapproved new animal drugs of low regulatory priority (LRP drugs)***

LRP drugs do not require a new animal drug application (NADA) or INAD exemptions from FDA. Further regulatory action is unlikely to be taken by FDA on LRP drugs as long as an appropriate grade of the drug or chemical is used, good management practices are followed, and local environmental requirements are met (such as NPDES permit requirements contained in this Permit). LRP drugs commonly used at CAAP facilities in the Region include the following:

1. Acetic acid, used as a dip at a concentration of 1,000-2,000 mg/L for 1-10 minutes as a parasiticide for fish.
2. Carbon dioxide gas, used for anesthetic purposes in cold, cool and warm water fish.
3. Hydrogen peroxide, used at 250-500 mg/L to control fungi on all species and life stages of fish, including eggs.
4. Povidone iodine (PVP) compounds, used as a fish egg disinfectant at rates of 50 mg/L for 30 minutes during egg hardening and 100 mg/L solution for 10 minutes after water hardening.
5. Sodium bicarbonate (baking soda), used at 142-642 mg/L for 5 minutes as a means of introducing carbon dioxide into the water to anesthetize fish.
6. Sodium chloride (salt), used at 0.5-1% solution for an indefinite period as an osmoregulatory aid for the relief of stress and prevention of shock. Used as 3% solution for 10-30 minutes as a parasiticide.

FDA is unlikely to object at present to the use of these LRP drugs if the following conditions are met:

1. The aquaculture drugs are used for the prescribed indications, including species and life stages where specified.
2. The aquaculture drugs are used at the prescribed dosages (as listed above).
3. The aquaculture drugs are used according to good management practices.
4. The product is of an appropriate grade for use in food animals.
5. An adverse effect on the environment is unlikely.

FDA's enforcement position on the use of these substances should be considered neither an approval nor an affirmation of their safety and effectiveness. Based on information available in the future, FDA may take a different position on their use. In addition, FDA notes that classification of substances as new animal drugs of LRP does not exempt CAAP facilities from complying with all other federal, state and local environmental requirements, including compliance with this Permit

- ***Extra-label use of an approved new animal drug***

Extra-label drug use is the actual or intended use of an approved new animal drug in a manner that is not in accordance with the approved label directions. This includes, but is not limited to, use on species or for indications not listed on the label. Only a licensed veterinarian may prescribe extra-label drugs under FDA CVM's extra-label drug use policy. CVM's extra-label use drug policy (CVM Compliance Policy Guide 7125.06) states that licensed veterinarians may consider extra-label drug use in treating food-producing animals if the health of the animals is immediately threatened and if further suffering or death would result from failure to treat the affected animals. CVM's extra-label drug use policy does not allow the use of drugs to prevent diseases (prophylactic use), improve growth rates, or enhance reproduction or fertility. Spawning hormones cannot be used under the extra-label policy. In addition, the veterinarian assumes the responsibility for drug safety and efficacy and for potential residues in the aquatic animals.

RECEIVING WATER BENEFICIAL USES

The existing beneficial uses of the American River from Folsom Dam to the Sacramento River, as identified in Table II-1 of the Basin Plan, are municipal and domestic supply (MUN); irrigation (AGR); industrial service and power supply (IND, and POW); water contact recreation (including canoeing and rafting) (REC-1); non-contact water recreation (REC-2); warm and cold freshwater habitat (WARM and COLD); warm and cold water fish migration habitat (MIGR); warm and cold water spawning habitat (SPWN); and wildlife habitat (WILD).

Beneficial uses of the underlying groundwater are municipal and domestic supply (MUN), agricultural supply irrigation (AGR), industrial service supply (IND) and industrial process supply (PRO).

REASONABLE POTENTIAL ANALYSIS AND EFFLUENT LIMITATIONS

Federal regulations at 40 CFR Section 122.44 require NPDES permits to contain effluent limitations, including technology-based and water quality standards-based limitations and limitations based on toxicity.

The federal regulations at 40 CFR 122.44(d)(1) require effluent limitations for all pollutants that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an in-stream excursion above a numeric water quality criterion (such as CTR criterion) or a narrative water quality criterion within a State water quality standard. These regulations also set forth a methodology for establishing effluent limitations based on narrative state water quality criteria [40 CFR 122.44(d)(1)(vi)(A-C)].

The USEPA, SWRCB, and Regional Board have adopted or published standards that are used to implement 40 CFR 122.44. The USEPA has promulgated the CTR and NTR that established water quality criteria. The SWRCB has adopted the SIP that implements the CTR and NTR. The USEPA also has published recommended ambient water quality criteria and the Basin Plan contains numeric and narrative water quality objectives. The Basin Plan contains an Implementation Policy ("Policy for Application of Water Quality Objectives") that, in part, sets forth a process for translating narrative water quality objectives into numeric effluent limitations. The USEPA ambient water quality criteria, results of toxicity studies conducted by the California Department of Fish and Game, and the Basin Plan "Policy of Application of Water Quality Objectives" have been used to implement 40 CFR 122.44(d)(1)(v).

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs, the Regional Board determined that technology-based effluent limitations for total suspended solids (TSS) and settleable solids.

Total Suspended Solids and Settleable Solids

USEPA's final ELG for the aquaculture industry does not include numeric effluent limitations on any conventional, non-conventional, or toxic constituents. Rather, USEPA promulgated qualitative limitations in the form of BMP requirements. Technology-based requirements in this Order are based on a combination of application of the ELG for BMP requirements and case-by-case numeric limitations developed using best professional judgment (BPJ) and carried over from the previous Order. Section 402(o) of the CWA prohibits backsliding of effluent limitations that are based on BPJ to reflect a subsequently promulgated ELG that is less stringent. Order No. 5-00-268 (a revised Order) established effluent limitations for TSS of 5.0 mg/L net over levels in influent and 15 mg/L net as a monthly average and daily maximum, respectively, based on BPJ. In addition, the Order established effluent limitations for settleable solids of 0.1 ml/L net and 0.2 ml/L net as a monthly average and daily maximum, respectively, based on BPJ. Results of monitoring indicate the

Discharger is capable of meeting these limitations. Removal of these numeric limitations for TSS and settleable solids would constitute backsliding under CWA Section 402(o). The Regional Board has determined that these numeric effluent limitations for TSS and settleable solids continue to be applicable to the Facility and that backsliding is not appropriate. These limitations are established as a means of controlling the discharge of solids from algae, silt, fish feces and uneaten feed. This Order does not include mass effluent limitations for TSS because there are no standards that specifically require a mass-based effluent limitation, mass of the pollutant discharged is not specifically related to a measure of operation (40 CFR 122.45(f)(iii)), and, in addition, mass-based effluent limitations for TSS are not necessary because this Order includes both concentration-based limitations and a maximum flow limitation. These changes are consistent with Federal anti-backsliding provisions of 40 CFR 122.44(l)(1) and 122.62(a)(2).

Relationship Between Technology-based and Water Quality-based Requirements

In addition to establishing technology-based requirements based on the USEPA's ELG and BPJ, the Regional Board also considered the need for water quality-based limits for these pollutants. As the previous Order, the Regional Board determined that the TSS and settleable solids limitations are sufficient to ensure attainment of Basin Plan water quality objectives for sediment, settleable material, and suspended material.

WATER QUALITY-BASED EFFLUENT LIMITATIONS (WQBELs)

Based on effluent and receiving water study data submitted by the Discharger, routine effluent and receiving water monitoring, information from the Discharger regarding use of aquaculture drugs and chemicals, and DFG toxicity studies for aquaculture drugs and chemicals, the discharge has the reasonable potential to cause or contribute to an in-stream excursion above narrative or numeric water quality criteria or objectives for copper, pH, and formaldehyde. As required by 40 CFR Part 122.44 (d)(1)(i)-(iii), this Order includes effluent limitations for copper, pH, and formaldehyde. In addition, this Order carries over from the previous Order effluent limitations for dissolved oxygen (DO), turbidity, and total dissolved solids (TDS) based on water quality objectives from the Basin Plan.

In situations where receiving water flows are substantially greater than effluent flows, dilution may be considered in establishing effluent limitations. However, when a receiving water is impaired by a particular pollutant or stressor, limited or no pollutant assimilative capacity may be available in spite of the available dilution. Additionally, water quality based effluent limitations may be established considering acute wasteload allocations and the need to prevent acutely toxic conditions at the point of discharge. In these instances, and depending upon the nature of the pollutant, effluent limitations may be set equal to or less than the applicable water quality criteria or objectives that are applied at the point of discharge such that the discharge will not cause or contribute to a receiving water excursion above water quality objectives established to protect the beneficial uses. The copper and formaldehyde effluent limitations are based upon protection of

aquatic life from acute effects. Therefore, it is appropriate to calculate effluent limitations with no dilution allowance.

CTR Constituents

On 10 September 2001, the Executive Officer of the Regional Board issued a letter pursuant to Section 13267 of the California Water Code (CWC) requiring all NPDES Dischargers to conduct effluent and receiving water monitoring and submit results of this monitoring in accordance with a time schedule provided in the letter. The Discharger conducted a study to determine whether levels of NTR, CTR, or other pollutants in the discharge have the reasonable potential to cause or contribute to an in-stream excursion above a numeric or narrative water quality standard, including Basin Plan numeric or narrative objectives and CTR/NTR criteria. Results of this study were submitted to the Regional Board for samples taken on 9 April 2002 and 9 September 2003.

Copper

Copper, primarily in the forms of copper sulfate and chelated copper compounds, is used in fish hatcheries to control algae and other vegetation that is susceptible to the toxic effects of copper uptake, and it is used to control the growth of external parasites and bacteria on fish. Copper sulfate may be used at the Facility in the future at a rate of up to 0.5 pounds copper sulfate per 1 cfs in raceways. Lack of accurate flow measurements for the raceways precludes meaningful estimates of potential concentrations of copper in the discharge to or from the settling ponds. Copper concentration in the composited discharge from the Facility was 1.3 µg/L, but this sample represents the combined discharge from all outfalls and was not taken during copper treatments. Estimated potential discharge copper concentrations during copper treatments from other DFG facilities (Mt. Shasta, Mokelumne, Merced) range from 58 to 200 µg/L.

Copper is identified as a priority pollutant in the NTR and CTR. The CTR includes the Ambient Water Quality Criteria for the Protection of Aquatic Life for copper. The Criterion Maximum Concentration (CMC), a 1-hour average, and Criterion Continuous Concentration (CCC), a 4-day average, are hardness dependent. The criteria are expressed in terms of the dissolved fraction of the metal in the water column and are calculated from the total recoverable values by applying a conversion factor. The conversion factor in the CTR is 0.96 for both acute (CMC) and chronic (CCC) criteria. The applicable criteria will be based on the hardness of the effluent or receiving water. Water quality criteria for copper for the protection of aquatic life, as established by the CTR are 3.4 µg/L (acute) and 2.6 µg/L (chronic) criteria for dissolved copper (3.5 and 2.7 µg/L total recoverable) at 23 mg/L hardness, which is the minimum effluent and receiving water hardness reported with the Facilitiy's CTR monitoring. The site-specific copper criterion (acute) from the Basin Plan for the Lower American River (between Folsom Dam and the Sacramento River) is 10.4 µg/L (total recoverable). Based on DFG's estimates of potential application rates and flows, there is reasonable potential for copper to be present in the discharge at levels exceeding water quality criteria for the protection of aquatic life from the CTR. Accordingly, this Order includes WQBELs for copper.

Effluent limitations must be expressed as a total recoverable concentration. Since a site-specific translator has not been developed for copper as described in the SIP Section 1.4.1, the USEPA conversion factor for copper of 0.960 was used for translating the dissolved copper criterion into a total recoverable effluent concentration allowance (ECA) with no dilution. The Regional Board established both an Average Monthly Effluent Limitation (AMEL) and Maximum Daily Effluent Limitation (MDEL) for copper based on procedures outlined in the SIP as shown in Attachment C.

Because the toxicity of several metals increases with decreasing hardness levels in the receiving water, the CTR criteria for some metals, including copper, must be adjusted to account for the hardness of the effluent. The site-specific, acute criterion from the Basin Plan is fixed at 10.4 µg/L and is more stringent than the CTR acute criterion when receiving water hardness equals or exceeds 73 mg/L. The following table shows sample calculations of the CTR criteria for copper (fresh water aquatic life criteria), adjusted to account for varying hardness levels and expressed as total recoverable metal based on the following formulae:

Chronic Criterion (from CTR)

$Cu_{chronic}$ (in µg/L) = $e^{(0.8545)(\ln \text{hardness})-1.702}$

Acute Criterion (CTR) for Receiving Water Hardness Less Than 73 mg/L:

Cu_{acute} = (in µg/L) = $e^{(0.9422)(\ln \text{hardness})-1.700}$

Sample Calculations of Aquatic Life Criteria for Copper as Total Recoverable Metal

	Aquatic Life Criteria (µg/L)	
Effluent Hardness	**Chronic**	**Acute**
20 mg/L $CaCO_3$	2.36	3.07
25 mg/L $CaCO_3$	2.85	3.79
30 mg/L $CaCO_3$	3.33	4.50
35 mg/L $CaCO_3$	3.80	5.21
40 mg/L $CaCO_3$	4.26	5.90
45 mg/L $CaCO_3$	4.72	6.60
50 mg/L $CaCO_3$	5.16	7.29
60 mg/L $CaCO_3$	6.03	8.65
70 mg/L $CaCO_3$	6.88	10.0

Once the need for effluent limitations for CTR priority pollutants has been established, the SIP requires the following steps to determine specific limitations.

- For each water quality criterion/objective, an effluent concentration allowance (ECA) is calculated from the following equation to account for dilution, and background levels of each pollutant.

  ECA = C + D (C – B), where C is the converted/adjusted water quality criterion, D is the dilution credit, and B is the ambient background concentration.

  The SIP permits an allowance for dilution only after characterization of the receiving water flow by the Discharger to determine a dilution ratio and/or whether or not a dilution credit is appropriate. In this Order, no credit is being allowed for dilution, so the ECA equals C.

- For each ECA based on an aquatic life criterion, the long-term average discharge condition (LTA) is determined by multiplying the ECA times a factor (a multiplier) to account for effluent variability. The LTA is a target of treatment performance.

- LTA multipliers are determined based on a coefficient of variation (CV) and on a specified probability of occurrence. The CV is a measure of the variability of a set of data; and in the analysis for this Facility, because there were fewer than 10 data points, the CV was set equal to a default value of 0.6. The LTA multipliers are based on the following equations:

$$LTA_c = ECA_c \times \exp\left(0.5\sigma_4{}^2 - z\sigma_4\right)$$
$$LTA_a = ECA_a \times \exp\left(0.5\sigma^2 - z\sigma\right)$$

where

σ = standard deviation
CV = coefficient of variation (where $\sigma^2 = \ln(CV^2 + 1)$)
(CV = 0.6 where less than 10 data points are available)
z = z-statistic for 95th percentile probability and 99th percentile probability
ECA_a = acute effluent concentration allowance
ECA_c = chronic effluent concentration allowance
LTA_a = acute long-term average
LTA_c = chronic long-term average

From Table 1 of the SIP, the ECA multipliers for calculating LTAs at the 99th percentile occurrence probability for copper are 0.527 (chronic multiplier) and 0.321 (acute multiplier). LTAs are calculated as follows:

Sample Calculations of Long-Term Average Concentrations of Copper

	ECA		ECA Multiplier		LTA (µg/L)	
Receiving Water Hardness	**Chronic**	**Acute**	**Chronic**	**Acute**	**Chronic**	**Acute**
20 mg/L $CaCO_3$	2.36	3.07	0.527	0.321	1.24	0.986
25 mg/L $CaCO_3$	2.85	3.79	0.527	0.321	1.50	1.22
30 mg/L $CaCO_3$	3.33	4.50	0.527	0.321	1.76	1.44
35 mg/L $CaCO_3$	3.80	5.21	0.527	0.321	2.00	1.67
40 mg/L $CaCO_3$	4.26	5.90	0.527	0.321	2.25	1.90
45 mg/L $CaCO_3$	4.72	6.60	0.527	0.321	2.48	2.12
50 mg/L $CaCO_3$	5.16	7.29	0.527	0.321	2.72	2.34
60 mg/L $CaCO_3$	6.03	8.65	0.527	0.321	3.18	2.78
70 mg/L $CaCO_3$	6.88	10.0	0.527	0.321	3.62	3.21

- Using the most limiting (the lowest) LTA, water quality based effluent limitations (WQBELs) are calculated. WQBELs include an average monthly effluent limitation (AMEL) and a maximum daily effluent limitation (MDEL). The equations used to calculate these limits are as follows:

$$LTA = \min(LTAa, LTAc)$$
$$AMEL = LTA \times \exp\left(z\sigma_n - 0.5\sigma_n^{\,2}\right)$$
$$MDEL = LTA \times \exp\left(z\sigma - 0.5\sigma^2\right)$$

where

LTA_a = acute long-term average
LTA_c = chronic long-term average
LTA = Most stringent long-term average
σ = Standard deviation
CV = coefficient of variation (where $\sigma^2 = \ln(CV^2 + 1)$
(CV = 0.6 where less than 10 data points are available)
z = z-statistic for 95th percentile probability (AMEL) and 99th percentile probability (MDEL)
n = number of samples per month
AMEL = average monthly effluent limitation
MDEL = maximum daily effluent limitation

AMELs and MDELs are calculated by multiplying the most limiting LTA for each pollutant times a multiplier that accounts for averaging periods and exceedance frequencies of the effluent limitations, and for the AMEL, the effluent monitoring frequency. Here, the CV was set equal to the default value of 0.6 (CV = 0.6) and the sampling frequency was set equal to 4 (n = 4). A 99th percentile occurrence probability was used to determine the MDEL multiplier and a 95th percentile occurrence probability was used to determine the

AMEL multiplier. From Table 2 of the SIP, the MDEL multiplier is 3.11, and the AMEL multiplier is 1.55. Final WQBELs for copper are determined as follows.

Sample Calculations Effluent Limitations for Copper

Receiving Water Hardness	LTA	AMEL Multiplier	MDEL Multiplier	MDEL (µg/L)	AMEL (µg/L)
20 mg/L $CaCO_3$	0.986	1.55	3.11	1.53	3.07
25 mg/L $CaCO_3$	1.22	1.55	3.11	1.89	3.79
30 mg/L $CaCO_3$	1.44	1.55	3.11	2.24	4.49
35 mg/L $CaCO_3$	1.67	1.55	3.11	2.59	5.20
40 mg/L $CaCO_3$	1.90	1.55	3.11	2.94	5.89
45 mg/L $CaCO_3$	2.12	1.55	3.11	3.28	6.59
50 mg/L $CaCO_3$	2.34	1.55	3.11	3.62	7.27
60 mg/L $CaCO_3$	2.78	1.55	3.11	4.30	8.64
70 mg/L $CaCO_3$	3.21	1.55	3.11	4.98	9.99

- Because effluent hardness may vary, the Discharger will determine the effluent hardness and calculate the appropriate effluent limitation each time copper is sampled in the effluent. Attachment C provides the formulae for calculating effluent limitations for copper based on hardness and provides sample calculations.

Section 2.1 of the SIP provides that: "*Based on an existing discharger's request and demonstration that it is infeasible for the discharger to achieve immediate compliance with a CTR criterion, or with an effluent limitation based on a CTR criterion, the RWQCB may establish a compliance schedule in an NPDES permit*." Although the effluent limitations for copper are new requirements in this Order, the Discharger has not reported using used copper sulfate at the Facility in recent years and, therefore, should be able to manage use of copper sulfate to comply with the new effluent limitations. This Order does not establish a compliance schedule for copper limitations in this Order, but requires compliance with final effluent limitations for copper immediately.

Mercury

The Lower American River between Nimbus Dam and the Sacramento River is impaired by mercury. Mercury is identified as a priority pollutant in the NTR and CTR. The CTR includes the Ambient Water Quality Criterion for the Protection of Human Health (for consumption of water and organisms) of 0.050 µg/L for mercury. The Discharger collected two effluent and two receiving water samples for mercury. Mercury was detected in the Facility's effluent at concentrations of 0.00115 µg/L and 0.0781 µg/L. Mercury concentrations in the receiving water were reported as 0.00081 and 0.00143 µg/L. The maximum effluent concentration of mercury exceeds the CTR criterion. However, the there are no known processes or materials which the Discharger uses as a result of hatchery operation that contain or contribute mercury to the final effluent. For this Facility, intake water is from the same water body as the receiving water body. In accordance with Section 1.4.4 of the SIP, the Regional Board may consider priority pollutants in intake water on a

pollutant-by-pollutant and discharge-by-discharge basis when establishing water quality based effluent limitations provided certain conditions are met. The current data are insufficient to determine whether effluent concentrations of mercury are a result of spatial or temporal changes in mercury concentrations of the influent supply water, or may be influenced by groundwater accretions within the settling ponds. Therefore, this Order requires the Discharge to conduct a study of influent, effluent, and receiving water mercury concentrations to determine whether mercury is discharged from the facility at levels that cause, have the reasonable potential to cause, or contribute to an excursion of applicable water quality standards. Based upon the results of this study, this Order may be reopened to include final effluent limitations for mercury based upon the CTR criterion, a load allocation from the TMDL, or, limitations which reflect intake water credits in accordance with Section 1.4.4 of the SIP if applicable.

Non-CTR Constituents

pH

The Basin Plan contains water quality objectives for pH in the form of a range of acceptable pH values (measured in standard units). In the previous Order, the Regional Board established effluent limitations in the form of an acceptable range of pH between 6.5 and 8.5 standard units for discharges to the American River. This existing pH limitation is carried over to this Order with the addition, however, that an effluent pH outside of this range is acceptable only where influent pH measured at the same time also is outside the range. In such cases, effluent pH may be outside the acceptable range, but only to the same extent that influent pH is outside of this range. This limitation will control the discharge of drugs or chemicals (e.g., acetic acid) that may alter the pH of the effluent. Based on recent self-monitoring reports, the discharge has remained within the acceptable range.

Dissolved Oxygen (DO)

The Basin Plan contains water quality objectives for dissolved oxygen (DO) concentrations not to be reduced below minimum levels (measured in mg/L). For waters designated COLD and SPWN, the Basin Plan specifies that the DO concentrations shall not be reduced below 7.0 mg/L at any time. In the previous Order, the Regional Board established effluent limitations requiring a minimum DO concentration of 7 mg/L for discharges to the American River. Based on self-monitoring reports, the discharge and receiving water DO concentrations have periodically fallen below 7.0 mg/L. The existing DO limitation is carried over to this Order with the addition, however, that an effluent DO below 7.0 mg/L is acceptable only where influent DO measured at the same time also is outside the range and there is no reduction in DO from the influent to the effluent.

Turbidity

The Basin Plan contains turbidity water quality objectives for the American River from Folsom Dam to the Sacramento River. Except for periods of storm runoff, the Basin Plan specifies that the

turbidity shall be less than or equal to 10 NTUs. The previous Order included an effluent limitation for turbidity of 10 NTUs as a maximum daily limitation. To ensure continued compliance with the water quality objective from the Basin Plan, this effluent limitation is retained in this Order.

Aquaculture Drugs and Chemicals

Numeric water quality criteria, or Basin Plan numeric objectives currently are not available for most of the aquaculture drugs and chemicals used by the Discharger or proposed for use at this Facility. Therefore, the Regional Board used the narrative water quality objective for toxicity from the Basin Plan and applied the Policy for "Application of Water Quality Objectives" as a basis for determining "reasonable potential" for discharges of these drugs and chemicals. This objective states, in part: "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life." The Basin Plan states that compliance with this objective will be determined by several factors, including biotoxicity tests of appropriate duration, or other analytical methods as specified by the Regional Board. (Biotoxicity testing involves measuring the toxic effects of an effluent on specified organisms according to nationally approved protocols). USEPA's TSD specifies two toxicity measurement techniques that can be employed in effluent characterization; the first is Whole Effluent Toxicity (WET) testing, and the second is chemical-specific toxicity analyses. WET testing is used most appropriately when the toxic constituents in an effluent are not completely known; whereas chemical-specific analysis is more appropriately used when an effluent contains only one, or very few, well-known constituents. Due to the nature of operations and chemical treatments at most CAAP facilities in the Region, CAAP facility effluents generally contain only one or two known chemicals at any given a time. Therefore, the Regional Board is using a chemical-specific approach to determine "reasonable potential" for discharges of aquaculture drugs and chemicals from CAAP facilities. The California Department of Fish and Game (DFG) Pesticide Unit has initiated biotoxicity studies to determine the aquatic toxicity of certain aquaculture drugs and chemicals commonly used at their CAAP facilities in the Region; specifically, formalin, hydrogen peroxide, oxytetracycline, penicillin G, potassium permanganate, and PVP iodine and is required by this Order to conduct toxicity testing on several additional aquaculture drugs and chemicals.

Formalin as Formaldehyde

A 37 percent formaldehyde solution (formalin) is periodically used at hatcheries as a fungicide treatment on fish eggs and fish in the raceways. Although the Discharger has not used formalin on a routine basis, it has requested the ability to use formalin in the future. Formalin (also known by the trade names Formalin-F®, Paracide-F®, PARASITE-S®) is approved through FDA's New Animal Drug Application (NADA) program for use in controlling external protozoa and monogenetic trematodes on fish, and for controlling fungi of the family *Saprolegniacae* in food-producing aquatic species (including trout and salmon). For control of other fungi, formalin may be used under an Investigational New Animal Drug (INAD) exemption. Formalin typically is used as a "drip" treatment to control fungus on fish eggs at a concentration of 1,000 to 2,000 ppm for 15

minutes, or as a "flush" treatment in raceways of 1-8 hours in duration at a concentration of 170 to 250 ppm for 1-hour or, based on DFG use assumptions, at 25 ppm for 8-hours. Lack of accurate flow measurements for the raceways precludes meaningful estimates of formaldehyde concentrations in the discharge to the settling ponds. Monitoring reports from May 2000 through September 2003 indicate no detected concentrations of formaldehyde in the discharges from Outfall 001, Outfall 002, or Outfall 003. However, in May 2000, the Discharger sampled the settling ponds and receiving water for formaldehyde and found that the settling ponds contained formaldehyde at a concentration of 1.4 mg/L and a sample from the American River 100 feet downstream of the settling ponds contained formaldehyde at a concentration of 0.55 mg/L. The Discharger indicated that it believed the problem leading to these high levels of formaldehyde was related to malfunctioning of the pump that meters out formalin at a specific rate for treatment.

The Basin Plan contains a narrative water quality objective for toxicity that states in part that "[a]*ll waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*" (narrative toxicity objective). Aquatic habitat is a beneficial use of the American River. The DFG Pesticide Unit conducted biotoxicity studies to determine the aquatic toxicity of Formalin using *Pimephales promelas* and *Ceriodaphnia dubia* in accordance with the analytical methods specified in EPA600/4-91-002, *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*. These "short-term chronic tests" measure effects such as reduced growth of the organism, reduced reproduction rates, or lethality. Results were reported as a No Observed Effect Concentration (NOEC) and a Lowest Observed Effect Concentration (LOEC). The DFG Pesticide Unit also conducted acute toxicity tests using *Ceriodaphnia dubia* in accordance with methods specified in EPA600/4-90/027, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms.* Acute toxicity test results typically are reported as the No Observed Adverse Effect Level (NOAEL), Lowest Observed Adverse Effect Level (LOAEL), and $LC_{50.}$

Results of chronic toxicity tests submitted by the DFG Pesticide Unit indicated *C. dubia* was the most sensitive species with a 7-day No Observable Effect Concentration (NOEC) value of 1.3 mg/L formaldehyde for survival and reproduction. Acute toxicity tests with *C dubia* showed a 96-hour NOAEL of 1.3 mg/L. A summary of the data submitted follows:

Species	7-day LC50 (mg/L)	LOEC (mg/L)	NOEC (mg/L)	LOAEL (mg/L)	NOAEL (mg/L)
Ceriodaphnia dubia	2.4	5.8[1] 1.3[2]	1.3[1] <1.3[2]	5.8	1.3
Pimephales promelas	23.3	9.09	2.28	--	--
Selenastrum capricornutum	<5.2	--	--	--	--

[1] Survival
[2] Reproduction

Since Formalin treatments are utilized as a batch or flush treatment which result in discharges from three to eight hours, short-term tests were conducted with *C dubia*, exposing the organisms for 2-hour and 8-hour periods, removing them from the chemical, and continuing the observation period for 7 days in clean water. The results were as follows:

Species	7-day LC50 (mg/L)	LOAEL (mg/L)	NOAEL (mg/L)
C. dubia—2-hour exposure	73.65	46.3	20.7
C. dubia—8-hour exposure	13.99	15.3	6.7

Results of both acute and chronic aquatic life toxicity testing conducted by the DFG Pesticide Unit were considered along with the Basin Plan narrative toxicity objective when determining whether water quality-based effluent limitations for Formalin as formaldehyde were necessary. Results of 7-day chronic toxicity tests indicated *Ceriodaphnia dubia* was the most sensitive species, with a 7-day NOEC value of 1.3 mg/L formaldehyde for survival and < 1.3 mg/L for reproduction (the Regional Board used an NOEC of 1.3 mg/L). Acute toxicity tests conducted using *Ceriodaphnia dubia* showed a 96-hour NOAEL of 1.3 mg/L formaldehyde. The additional acute toxicity tests with *Ceriodaphnia dubia* conduct using only an 8-hour exposure, resulted in a 96-hour NOAEL concentration of 6.7 mg/L formaldehyde. Based on the results of these toxicity tests, past discharges of formaldehyde from the Facility, and the potential for future discharges of formaldehyde from the Facility, formaldehyde may be discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of a narrative water quality objective for toxicity from the Basin Plan. Effluent concentrations of formaldehyde may persist because of potential application procedures (e.g., successive raceway treatments, drip treatments for eggs) and due to retention of effluent in the settling basins. Accordingly, this Order includes both maximum daily and average monthly water quality-based effluent limitations for formaldehyde.

Order No. 5-00-268 included a maximum daily limitation of 0.03 mg/L for formaldehyde based on a previous California Department of Health Services (DHS) Action Level for Drinking Water. There is no USEPA or California MCL for formaldehyde. Based on the new information from DFG toxicity tests, the lack of an MCL to adequately interpret chemical objectives from the Basin Plan, and to maintain consistency with permit requirements for similar CAAP facilities in the Region, the Regional Board has determined that it is appropriate to revise the formaldehyde limitations in this Order. Both an average monthly effluent limitation of 0.65 mg/L and a maximum daily effluent limitation of 1.3 mg/L were calculated based on the 96-hour NOAEL value and using the procedure in USEPA's TSD for calculating water quality-based effluent limitations. These effluent limitations are included in this Order and have been established for protection of aquatic life against toxic effects from exposure to formaldehyde in the discharge. This change in effluent limitations is consistent with the Federal anti-backsliding provisions of 40 CFR 122.44(l)(1) and 122.62(a)(2).

The Regional Board used USEPA's TSD guidance to calculate the MDEL and AMEL for formaldehyde as follows:

Assuming:

- No in-stream dilution allowance.
- Coefficient of Variation (CV) = 0.6 for the lognormal distribution of pollutant concentrations in effluent.

Effluent Concentration Allowance based on NOAEL (acute toxicity) with no dilution allowance

ECA_a = 1.3 mg/L

Effluent Concentration Allowance based on NOEC (chronic toxicity) with no dilution allowance

ECA_c = 1.3 mg/L

Long Term Average concentration based on acute ECA

LTA_a = 1.3 mg/L X 0.321 = 0.4173 mg/L
(where 0.321 = acute ECA multiplier at 99% occurrence probability and 99% confidence)

Long Term Average concentration based on chronic ECA

LTA_c = 1.3 mg/L X 0.527 = 0.6851 mg/L
(where 0.527 = chronic ECA multiplier at 99% occurrence probability and 99% confidence)

Most Limiting LTA concentration

LTA = 0.4173 mg/L

Average Monthly Effluent Limit

AMEL = LTA x 1.55
(where 1.55 = AMEL multiplier at 95% occurrence probability, 99% confidence, and n = 4)

AMEL = 0.4173 mg/L X 1.55 = **0.65 mg/L**

Maximum Daily Effluent Limit

MDEL = LTA x 3.11
(where 3.11 = MDEL multiplier at 99% occurrence probability and 99% confidence)

MDEL = 0.4173 mg/L X 3.11 = **1.3 mg/L**

Sodium Chloride and Calcium Chloride

The Discharger's monthly monitoring reports indicate that sodium chloride (salt) is use on a routine basis. DFG reports that a typical application rate for salt of up to 400 lbs per 3-hour flush treatment in raceway as a fish-cleansing agent to control the spread of fish disease and to reduce stress among the confined fish population. Sodium chloride may also be used in the hatchery building tanks. In the past, the Discharger has used calcium chloride at the Facility. Calcium chloride is used to increase water calcium concentration to ensure proper egg hardening. FDA considers sodium chloride and calcium chloride as unapproved new animal drugs of low regulatory priority (LRP drug) for use in aquaculture. Consequently, FDA is unlikely to take regulatory action if an appropriate grade is used, good management practices are followed, and local environmental requirements are met. Lack of accurate flow measurements precludes meaningful estimates of sodium chloride or calcium chloride concentrations in the discharge. However, the previous Order included effluent limitations of 125 mg/L for TDS as a daily maximum, based on the site-specific salinity objective from the Basin Plan, and 100 µmhos/cm for conductivity as a 14-day average. The Discharger has monitored effluent from Outfalls 001, 002, and 003 and the receiving water for conductivity and total dissolved solids. Conductivity levels (maximum ranging from 88-100 µmhos/cm) and concentrations of TDS (maximum ranging from 82-102 mg/L) are low in both the effluent and receiving water downstream of the settling ponds. However, because there is no indication that measurements of TDS and conductivity were taken for samples collected during treatment with sodium chloride or calcium chloride at the Facility, the effluent limitation for TDS, based on the site-specific Basin Plan water quality objective, is retained in this Order. The 14-day average limit for conductivity is removed from this Order. This conductivity limitation in the previous Order was not based on a site-specific water quality objective from the Basin Plan. The Basin Plan does contain a narrative objective for chemical constituents that states, in part, "Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses." Agricultural irrigation is a beneficial use of the receiving water. *Water Quality for Agriculture, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1* (R.S. Ayers and D.W. Westcot, Rome, 1985), recommends that the conductivity level in waters used for agricultural irrigation not exceed 700 µmhos/cm (Agricultural Water Quality Goal) because it will reduce crop yield for sensitive plants. Thus, an appropriate interpretation of the narrative objective for chemical constituents for conductivity is a limit of 700 µmhos/cm to protect agricultural beneficial uses of the American River. The Agricultural Water Quality Goal for TDS is 450 mg/L. Monitoring data show that conductivity of the Discharge is consistently well below the Agricultural Water Quality Goal. Furthermore, TDS concentration and conductivity levels are related. Retaining the TDS limitation and, thus, controlling TDS in the discharge will control the conductivity level. Removal of the conductivity limitation is consistent with the Federal anti-backsliding provisions of 40 CFR 122.44(l) and 122.62(a). Effluent and receiving water monitoring of both conductivity and TDS is still required, and monthly use of sodium chloride and calcium chloride must be reported as specified in the Monitoring and Reporting Program.

Hydrogen Peroxide

Hydrogen peroxide (35 % H_2O_2) is used periodically at the Facility. Hydrogen peroxide may be used as a short-term immersion bath treatment in holding tanks, or as a raceway flush treatment. FDA considers hydrogen peroxide to be an LRP drug when used to control fungi on fish at all life stages, including eggs. Hydrogen peroxide may also be used under an INAD exemption to control bacterial gill disease in various fish, fungal infections, external bacterial infections, and external parasites. Hydrogen peroxide is a strong oxidizer that breaks down into water and oxygen; however, it exhibits toxicity to aquatic life during the oxidation process. Results of a single acute toxicity test conducted by DFG using *C. dubia* showed a 96-hour NOAEL of 1.3 mg/L. Since there is limited toxicity information available at this time and no information regarding actual discharge concentrations of hydrogen peroxide, this Order does not include water quality-based effluent limitations for hydrogen peroxide. However, use and monitoring of hydrogen peroxide must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in Provision No. 4. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations for hydrogen peroxide based on additional use and toxicity information.

Potassium Permanganate

Potassium permanganate (also known by the trade name of Cairox^{TM}) has been used periodically at the Facility to control gill disease. Potassium permanganate has a low estimated lifetime in the environment, being readily converted by oxidizable materials to insoluble manganese dioxide (MNO_2). In non-reducing and non-acidic environments, MNO_2 is insoluble and has a very low bioaccumulative potential. Potassium permanganate is not approved for use in aquaculture under FDA's NADA program and should therefore be used in accordance with an INAD exemption granted by FDA. Results of a single acute toxicity test using *C. dubia* conducted by DFG showed a 96-hour NOAEL of 0.25 mg/L for potassium permanganate. Since there is limited toxicity information available at this time and no information regarding actual discharge concentrations of potassium permanganate, this Order does not include water quality-based effluent limitations for potassium permanganate. However, use and monitoring of potassium permanganate must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in Provision No. 4. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

PVP Iodine

PVP Iodine, a solution composed of 10% PVP iodine complex and 90% inert ingredients, may be used at the Facility in the future as a fish egg disinfectant (fungicide). FDA considers PVP iodine an LRP drug for use in aquaculture. Results of a single acute toxicity test with *Ceriodaphnia dubia* showed a 96-hour NOAEL of 0.86 mg/L. Since there is limited toxicity information available at

this time and no information regarding actual discharge concentrations of PVP iodine, this Order does not include water quality-based effluent limitations for PVP iodine. However, use and monitoring of PVP iodine must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in Provision No. 4. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations for PVP iodine based on additional use and toxicity information.

Chloramine-T

Chloramine-T is not currently used but may be used by the Discharger in the future as a possible replacement for formalin. Chloramine-T is available for use in accordance with an INAD exemption by FDA. Chloramine-T breaks down into para-toluenesulfonamide (p-TSA) and, unlike other chlorine-based disinfectants, does not form harmful chlorinated compounds. The Regional Board does not have estimates of discharge concentrations of chloramine-T at this Facility. The Discharger has not conducted biotoxicity tests using Chloramine-T, however results of toxicity testing from other sources show a 96-hour LC_{50} for rainbow trout of 2.8 mg/L and a 48-hour NOEC for *Daphnia magna* of 1.8 mg/L (Halamid. n.d. *Halamid, Aquaculture* http://www.halamid.com/aqua.htm). The DFG Pesticide Unit is proposing to conduct additional toxicity testing on Chloramine-T to determine NOAEL concentrations. Since there is limited toxicity information available and no information regarding actual discharge concentrations of chloramine-T, this Order does not include water quality-based effluent limitations for chloramine-T. However, use and monitoring of chloramine-T must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in Provision No. 4 . The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

MS-222 and Aqui-S®

In the future, the Discharger may use the anesthetics tricaine methanesulfonate, commonly known as MS-222 (with trade names of Finquel® or Tricaine-S®) and Aqui-S®. MS-222 has been approved by FDA for use as an anesthetic for Salmonidae. It is intended for the temporary immobilization of fish, amphibians and other aquatic, cold-blooded animals. It has been recognized as a valuable tool for the proper handling of these animals during manual spawning (fish stripping), weighing, measuring, marking, surgical operations, transport, photography, and research. MS-222 is a crystalline powder used as an immersion bath in an enclosed tub. Aqui-S® is a water dispersible liquid anaesthetic for fin fish, crustacea and shell fish and is used in the US under an INAD exemption. The Regional Board does not have specific toxicity information for MS-222 or Aqui-S®or estimates of potential discharge concentrations of MS-222 and Aqui-S®at this Facility. Since there is limited toxicity information available at this time and no information regarding actual discharge concentrations of MS-222 or Aqui-S®, this Order does not include water quality-based effluent limitations for MS-222 or Aqui-S®. However, use and monitoring of MS-222 and Aqui-S® must be reported as specified in the attached Monitoring and Reporting Program and results of

additional toxicity tests must be submitted as specified in Provision No. X. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

Oxytetracycline and Penicillin G

The hatchery may periodically use the antibiotics oxytetracycline and penicillin G as therapeutic agents in bath treatments to control fish diseases. Bath treatments are used to treat small fish in 600-gallon tanks at 100 ppm (mg/L). The Discharger has estimated the maximum concentration of penicillin G in the discharge from the NFH to be 8 mg/L and the maximum concentration from the ARTH to be significantly lower due to greater dilution. Oxytetracycline may be administered at similar concentrations (100 ppm) and, therefore, similar discharge concentrations would be expected.

Penicillin G, also known as Pen-G, is an antibiotic used in a six to eight hour immersion bath treatment to control acute disease outbreaks and has been used in the past at the Facility. Penicillin G is not approved under FDA's NADA program and its' extra-label use in aquaculture requires a veterinarian's prescription. Due to the length of treatment time (up to eight hours), the Regional Board considered the results of acute and chronic aquatic life toxicity testing conducted by the DFG Pesticide Unit when determining whether water quality-based effluent limitations for penicillin G were necessary in this Order. Results of acute toxicity tests using *C. dubia* showed a 96-hour NOAEL of 890 mg/L. Results of 7-day chronic toxicity testing using *Pimephales promelas* showed 7-day NOEC for survival of 350 mg/L. The estimated discharge concentration of 8 mg/L of Penicillin G is well below the lowest NOEC and NOAEL. Therefore, at this time, penicillin G when used in an immersion bath treatment, is not discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of a narrative water quality objective for toxicity from the Basin Plans. Accordingly, this Order does not include an effluent limitation for penicillin G. However, monthly use of penicillin G must be reported as specified in the attached Monitoring and Reporting Program. The Regional Board will review this information, and other information as it becomes available, and this Order may be reopened to establish effluent limitations for penicillin G based on additional use and toxicity information.

Oxytetracycline, also known by the brand name Terramycin®, is an antibiotic approved through FDA's NADA program for use in controlling ulcer disease, furunculosis, bacterial hemorrhagic septicemia, and pseudomonas disease in Salmonids. Oxytetracycline is most commonly used at CAAP facilities as a feed additive. However, oxytetracycline may also be used as an extra-label use under a veterinarian's prescription in an immersion bath of approximately six to eight hours in duration. Because Oxytetracycline may be applied in an immersion bath for up to eight hours at a time, the Regional Board considered the results of acute and chronic aquatic life toxicity testing conducted by the DFG Pesticide Unit when determining whether water quality-based effluent limitations for oxytetracycline used in an immersion bath treatment were necessary in this Order. Results of acute toxicity tests using *C. dubia* showed a 96-hour NOAEL of 40.4 mg/L. Results of chronic toxicity tests using *C. dubia* showed a 7-day NOEC for reproduction of 48 mg/L. The

estimated discharge concentration of 8 mg/L of oxytetracycline is well below the lowest NOEC and NOAEL. Therefore, at this time, oxytetracycline when used in an immersion bath treatment, is not discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of a narrative water quality objective for toxicity from the Basin Plans. Accordingly, this Order does not include an effluent limitation for oxytetracycline. However, monthly use of oxytetracycline must be reported as specified in the attached Monitoring and Reporting Program. The Regional Board will review this information, and other information as it becomes available, and this Order may be reopened to establish effluent limitations for oxytetracycline based on additional use and toxicity information.

Antibiotics in Feed Formulations

Oxytetracycline, Romet-30® (sulfadimethoxine, ormetoprim), and florfenicol are antibiotics that may potentially be used by the Discharger in feed formulations to control acute disease outbreaks. Erythromycin (injected or used in feed formulations) and amoxycillin (injected) also are antibiotics that may be used to control disease. These antibiotics must be used under conditions in the NADA approval (oxytetracycline and Romet-30®) or an INAD exemption or a veterinarian's prescription for extra-label use. Of these antibiotics, the Discharger has used only oxytetracycline in feed in the past four years. In the NPDES General Permit for Aquaculture Facilities in Idaho (Idaho General Permit), USEPA Region 10 distinguishes between antibiotics applied in feed formulations and antibiotics applied in immersion baths. The Idaho General Permit concludes that drugs or chemicals administered via feed, and ingested by fish, pose little threat to aquatic life or beneficial uses because a majority of the drug is utilized by the fish, though some literature suggests otherwise. As stated in the Idaho General Permit, "USEPA believes that disease control drugs and other chemicals provided for ingestion by fish do not pose a risk of harm or degradation to aquatic life or other beneficial uses." Based on similar conclusions as those drawn by USEPA for the Idaho General Permit, the Regional Board has determined that oxytetracycline, Romet-30®, and florfenicol, (when used in feed formulations), erythromycin (when injected or used in feed formulations) and amoxycillin (when injected) are used in a manner that reduces the likelihood of direct discharge to waters of the United States or waters of the State, particularly when Dischargers implement BMPs, as required by this Order. Therefore, oxytetracycline, Romet-30®, and florfenicol, (when used in feed formulations), erythromycin (when injected or used in feed formulations) and amoxycillin (when injected) are not likely to be discharged from the Facility at levels that would cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan narrative water quality objectives for toxicity. Accordingly, this Order does not include water quality-based effluent limitations for these substances; however, it does require reporting use as specified in the attached Monitoring and Reporting Program. If, in the future, additional information becomes available regarding the use or toxicity of any of these substances, the Regional Board will re-evaluate whether its discharge may cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan objectives for toxicity and, if necessary, re-open this Order to include numeric effluent limits.

Acetic Acid, Carbon Dioxide, and Sodium Bicarbonate

Acetic acid is used at CAAP facilities for the control of external parasites. Carbon dioxide gas is used to anesthetize fish prior to spawning. Sodium bicarbonate, or baking soda, also is used as a means of introducing carbon dioxide into the water to anesthetize fish. These substances are or may be discharged from the Facility in the future. FDA considers these substances LRP drugs for use in aquaculture. Based upon available information regarding the use of these substances at CAAP facilities in the Region, the Regional Board does not believe that acetic acid, carbon dioxide gas, or sodium bicarbonate will be discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan narrative water quality objectives for toxicity. Accordingly, this Order does not include water quality-based effluent limitations for any of these substances; however, use of these substances must be reported as specified in the attached Monitoring and Reporting Program. In the future, as additional information becomes available regarding the use or toxicity of acetic acid, carbon dioxide gas, or sodium bicarbonate, the Regional Board will re-evaluate whether the discharge of any of these substances to receiving waters may cause, have the reasonable potential to cause, or contribute to an excursion of the Basin Plan objectives for toxicity and, if necessary, re-open this Order to include numeric effluent limits.

Vibrio Vaccine and Enteric Redmouth Bacertin

The Discharger has indicated that it may use a vibrio vaccine and an enteric redmouth bacertin in the future. Vibrio vaccine may be used as an immersion or an injectable vaccine and helps protect salmonid species from vibriosis disease caused by Vibrio anguillarum serotype I and Vibrio ordalii. Vibrio vaccine stimulates the fish's immune system to produce protective antibodies, helping the animal defend itself against vibriosis. Enteric redmouth (or yersiniosis) bacertins are formulated from inactivated Yersinia ruckeri bacteria and may also be used as an immersion or vaccine to help protect salmonid species from enteric redmouth disease caused by Yersinia ruckeri. These bacertins stimulate the fish's immune system to produce protective antibodies. These veterinary biologics are licensed for use by the US Department of Agriculture's (USDA's) Center for Veterinary Biologics. Veterinarians should be consulted before beginning an immunization program. According to USDA, most biologics leave no chemical residues in animals and most disease organisms do not develop resistance to the immune response by a veterinary biologic. Based upon available information regarding the use of these substances at CAAP facilities, the Regional Board does not believe that vibrio vaccine or enteric redmouth bacertins, when used according to label and veterinarian instructions, are discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan narrative water quality objectives for toxicity. Accordingly, this General Order does not include water quality-based effluent limitations for these substances; however, use of these substances must be reported as specified in the attached Monitoring and Reporting Program. In the future, as additional information becomes available regarding the use or toxicity of these biologics, the Regional Board will re-evaluate whether the discharge of any of these substances to receiving waters may cause, have the reasonable potential to cause, or contribute to an excursion of the Basin Plan objectives for toxicity and, if necessary, re-open this Order to include numeric effluent limitations.

BASIS FOR WASTE DISPOSAL PROVISIONS

Solid waste disposal provisions in this Permit are based on the requirements of CCR Title 27 and prevention of unauthorized discharge of solid wastes into waters of the United States or waters of the State.

BASIS FOR BEST MANAGEMENT PRACTICES PROVISIONS

Best Management Practices plan requirements are established based on requirements in Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category at 40 CFR Part 451.

BASIS FOR RECEIVING WATER LIMITATIONS

Receiving water limitations are interpretations of water quality objectives from the Basin Plan. Receiving water limitations in this Permit are included to ensure protection of beneficial uses of receiving waters. A receiving water condition not in conformance with a limitation is not necessarily a violation of the Permit. However, the Regional Board may require an investigation to determine cause and culpability prior to asserting that a violation has occurred.

MONITORING AND REPORTING PROGRAM

Receiving water monitoring requirements are based on the Basin Plan and authorized by California Water Code Section 13383. Receiving water monitoring requirements are standard requirements in almost all NPDES permits issued by the Regional Board. Upstream receiving water monitoring station R-1 is 100 feet upstream from the Fish Ladder. Downstream receiving water monitoring station R-2 is 100 feet downstream from the seepage points from the settling ponds.